REMARKS

This is in response to the Office Action mailed on July 29, 2004.

No claims are amended, no claims are canceled, and claims 37 and 38 are added; as a result, claims 1-38 are now pending in this application. No new matter is introduced. Applicant respectfully requests reconsideration of the above-identified application in view of the remarks that follow.

Support for claims 37 and 38 can be found, for example, in the material incorporated by reference in its entirety from co-pending application 09/144,202, now issued U.S. Patent 6,320,222. Supporting examples from the incorporated material can be found in the figures and in the amendments to the specification filed in the response, mailed 27 May 2003, to Office Action, mailed 25 February 2003, on page 17.

Applicant appreciates the time provided by Examiner Trinh to discuss the claims with Applicant's representative, David R. Cochran, though no agreement was reached in the interview. An interview summary is filed herewith.

First §103 Rejection of the Claims

Claims 1-26 were rejected under 35 USC § 103(a) as being unpatentable over Mazure et al. (U.S.5,308,782) taken with Mukai (U.S. 5,804,848) and Colinge (Article of "Reduction of Kink Effect...."). Applicant traverses these grounds of rejection of these claims.

The Office Action states "the limitations of 'width is sufficiently thin relative to a doping concentration' and 'negligible' are merely relative terms. Although the 'bulk charge' is negligible in operation, the bulk charge still has a value by mathematic calculation." Applicant respectfully disagrees, since this quote refers to language of claim 1 out of context. Claim 1, in part, recites "the body region is formed having a width that is sufficiently thin relative to a doping concentration (NA) of the body region such that a bulk charge (QB) is negligible in transistor operation." In context, claim 1 deals with a method of forming a body region in which a feature of the method is to form the body region having a width to doping concentration relationship such that the bulk charge substantially does not effect operation of the transistor. Such a feature can be realized in performing a method of forming a transistor. The claims do not state that there is no bulk charge, but that the method includes using a width-doping

concentration such that the bulk charge dose not substantially effect transistor operation. This language in claim 1 is functional language used to provide clarity to the claimed feature of a width and doping concentration relationship. *See MPEP §2173.01.*

Applicant cannot find in Mazure et al. (hereafter Mazure) taken with Mukai and Colinge a teaching or suggestion of a method including forming a fully depleted body region having a width and doping concentration as recited in claim 1. The Office Action rejection appears to be based on the Office Action proposition that is it inherent that a fully depleted body region has a doping concentration and width such that a bulk charge (QB) has negligible effect in transistor operation. Applicant respectfully disagrees since the Office Action has not established a *prima facie* case of inherency. "In relying upon the theory of inherency, the examiner must provide basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art," citing Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). MPEP § 2112

Further, with respect to a fully depleted structure, Applicant submits that the combination of Mazure and Colinge does not render the fully depleted structure as recited in claim 1 obvious. Mazure deals with vertically stacking transistors in a memory device. Colinge deals with a horizontal transistor structure having a gate on a gate oxide and a backside gate, not on a gate oxide, but on the back on the substrate on which the horizontal transistor is formed. There is no teaching or suggestion in Colinge regarding a vertical transistor structure having a body region as a fully depleted structure. The Office Action has not provided a reference to support the modification of Colinge and Mazure as proposed in the Office Action.

The Office Action states:

> Also it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the transistor body regions of Mazure to have a thickness as taught by Colinge so as to form the thin film transistor comprising a thin body channel region operated as fully depleted structure. This is because of the desirability to reduce the kink effect, current overshoots, and to form a very thin transistor.

As noted in the opening sentences of the first paragraph of Colinge, these desirable effects noted in the above quote, are related to problems whose origins arise from a horizontal silicon-on-

insulator n-channel MOSFET and are floating-substrate effects. Mazure addresses problems of planar transistors with vertical transistor structures, where the initial vertical transistor in the structure is fabricated up from the substrate starting with a diffusion region (14) on which a drain region (28) is formed. It appears that Mazure does not need to address floating-substrate effects identified in Colinge. Thus there is no motivation to combine Colinge with Mazure. The fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990); MPEP § 2143.01. Applicant submits that the Office Action has not provided a reference suggesting the desirability of the combination and modification of the cited references, given that Mazure deals with vertical transistor structures and Colinge deals with a horizontal transistor structure, and the reasons for the combination provided in the Office Action do not appear to apply.

A fully depleted structure provided from combining the cited references does not teach or suggest a method that uses dimensions and concentrations relative to the effect on a body region's bulk charge on transistor operation. Thus, applicant submits that Mazure taken with Mukai and Colinge does not teach or suggest all the elements of the method as recited in claim 1, and that claim 1 is patentable over Mazure taken with Mukai and Colinge.

Independent claims 8, 9, 13, 14, 20, and 21 recite elements similar to the elements of claim 1 discussed above and are patentable over Mazure taken with Mukai and Colinge for at least the reasons stated above and in further view of the elements of these independent claims. The claims dependent on claims 1, 8, 9, 13, 14, 20, and 21 are patentable over Mazure taken with Mukai and Colinge for at least the reasons stated above and in further view of the elements of these dependent claims.

Applicant respectfully requests withdrawal of these rejections of claims 1-26, and reconsideration and allowance of these claims.

Second §103 Rejection of the Claims

Claims 1-30 were rejected under 35 USC § 103(a) as being unpatentable over Bertin et al. (U.S. 6,060,746) taken with Mukai (U.S. 5,804,848) and Lidow et al. (U.S. 4,680,853). Applicant traverses these grounds of rejection of these claims.

Applicant cannot find in Bertin et al. (hereafter Bertin) taken with Mukai and Lidow et al. (hereafter Lidow) a teaching or suggestion of a method including forming a fully depleted body region having a width and doping concentration as recited in claim 1. The Office Action rejection appears to be based on the Office Action proposition that is it inherent that a fully depleted body region has a doping concentration and width such that a bulk charge (QB) has negligible effect in transistor operation. Applicant respectfully disagrees since the Office Action has not established a *prima facie* case of inherency, because, as recited in MPEP § 2112, "In relying upon the theory of inherency, the examiner must provide basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art," citing Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original).

A fully depleted structure provided from combining the cited references does not teach or suggest a method that uses dimensions and concentrations relative to the effect on a body region's bulk charge on transistor. Thus, applicant submits that Bertin taken with Mukai and Lidow does not teach or suggest all the elements of the method as recited in claim 1, and that, at least for the reasons stated above, claim 1 is patentable over Bertin taken with Mukai and Lidow.

Independent claims 8, 9, 13, 14, 20, and 21 recite elements similar to the elements of claim 1 discussed above and are patentable over Bertin taken with Mukai and Lidow for at least the reasons stated above and in further view of the elements of these independent claims. The claims dependent on claims 1, 8, 9, 13, 14, 20, and 21 are patentable over Bertin taken with Mukai and Lidow for at least the reasons stated above and in further view of the elements of these dependent claims.

Applicant respectfully requests withdrawal of these rejections of claims 1-30, and reconsideration and allowance of these claims.

Third §103 Rejection of the Claims

Claims 31-36 were rejected under 35 USC § 103(a) as being unpatentable over Bertin et al. (U.S. 6,060,746) taken with Mukai (U.S. 5,804,848) and Lidow et al. (U.S. 4,680,853) as applied to claims 1-30 and further with Mazure et al. (U.S. 5,308,782). Applicant traverses these grounds of rejection of these claims.

Applicant submits that claims 31-36 are dependent on patentable claims 1, 8, 9, 13, 20 and 21, and, therefore, are patentable.

Applicant respectfully requests withdrawal of these rejections of claims 31-36, and reconsideration and allowance of these claims.

New Claims

Claims 37 and 38 are added and are in line with the subject matter of the claims pending examination. No new matter is introduced. Applicant respectfully requests consideration and allowance of these claims.

Applicant respectfully requests allowance of claims 1-38.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 371-2157 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

LEONARD FORBES ET AL.

By their Representatives,

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Date 28 October 2004 By David R. Cochran

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 28 day of October, 2004.

KACIA LEE Kacia Lee

Name Signature